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CUTTING HEAD OF DRY-SHAVING APPARATUS

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It has already been proposed to support the cutting plate of a dry-shaving apparatus, which plate is supported at its outer edge, also centrally on the underside by means of a pin whose other end bears, through the hollow shaft of the driving mechanism, upon a fixed part of the driving motor or of the casing. All the supporting faces, that is to say at those at the outer edge as well as those on the central portion of the cutting plate and those of the supporting body are preferably provided in the same plane. This construction offers the advantage that the cutting plate is appreciably less subject to vibrations and to curving due to the drive, as the case may be in connection with resonance phenomena, and to the steady pressure exerted on the skin so that a less satisfactory shaving effect or breakage due to phenomena of fatigue of the material are avoided as far as possible. Moreover, this creates the possibility of considerably increasing the surface swept by the cutting member, i.e., the operative surface without any risk of this weakest portion of the cutting plate being harmfully curved. Owing to the fact that all the supporting faces are provided in the same plane, an exactly fitting support is ensured even in the case of series manufacture so that the cutting plate cannot be curved during the mounting and the exchangability is guaranteed.

In order to be able to take up the supporting pin, the driving shaft, which generally serves to actuate a movable cutting member, should, however, be of rather solid construction especially if the length of the shaft and therefore the dimensions of the pin are comparatively large, which may lead to a larger diameter of the casing. Besides, the lubrication problem plays a certain part here whilst the pin and the hollow shaft must be very exactly worked.

With a cutting head of a dry-shaving apparatus which consists of a cutting member and a cutting plate which is supported at the outer edge and centrally on the underside, of which components at least one is movable, the invention provides another and better solution by securing the supporting body for the central support to the sidewall of the apparatus and to provide it with one or more apertures in which rotatable driving means such, for example, as cogwheels, balls, discs, rollers, etc. are provided which transfer the motion of the shaft of the driving mechanism to the movable part, in the present case the cutting plate and/or the cutting member. By the "side-wall of the apparatus" is meant here the side-wall of the cutting head or of the frame or the casing of the dry-shaving apparatus wherein the cutting head according to the invention is utilized.

The invention will be explained more fully with reference to the accompanying drawing, which represents diagrammatically, by way of example, two embodiments thereof.

Fig. 1 is a cross-sectional view in elevation of dry shaving apparatus according to my invention.

Fig. 2 is a cross-sectional view in elevation of a modification of the apparatus shown by means of Fig. 1.

According to the invention, the supporting body 4 is connected, through the intermediary of a flange 5, to the side-wall of the apparatus and more it exhibits apertures 6 in which are provided balls 7 which transfer the motion of the shaft 8 of the driving mechanism to the rotatable cutting member 2, and this through the intermediary of a cylindrical part 9 which is provided with two legs 10 which penetrate into holes provided in the cutting member 2. According to the invention the drive is preferably effected exclusively by friction. Since the actuation of the balls 7 takes place from the shaft 8 by means of a bow-shaped member 11 whose diameter corresponds to that of the actuated portion of the cylindrical body 9, I obtain here a transmission ratio of 1:1.

In the form of construction shown the cutting member 2 is pressed by means of a spring 12 against the running surface of the cutting plate 1. The other end of the spring 12 bears upon a flange 13 of the member 9. The cutting plate is secured to the casing by means of a nut 14. As may furthermore be seen from the Fig. 1, the cutting member 2 is centred at 15 on the central supporting body 4, which results, as has been stated, in that the cutting member runs more quietly. The cutting member may also be centred indirectly on the supporting body if it runs on a cylindrical depression of the central portion of the cutting plate, which depression surrounds the supporting body.

Another form of construction is represented in Fig. 2 wherein similar components are denoted by the same reference numerals. According to a further feature of the invention at the place of the apertures 6 the supporting body 4 forms a
hollow cylinder which is coaxially arranged with respect to the driving shaft 8 so that the balls 7 are actuated from the inside and the cutting member is actuated, through the intermediary of the cylindrical body 9, on the outside of the cylinder. The advantage of this construction resides in a reduction of the number of revolutions of the shaft 8 so that use may be made of a motor which runs at a comparatively high speed, which is beneficial to the dimensions. Besides, in contrast with the construction according to Fig. 1 the pressure between the balls 7 and the running surface of the cylindrical body 9 is not directed exactly axially but substantially radially so that these forces can be taken up by the body 9 itself. Furthermore, axial vibrations of the driving shaft are only transferred to the body 9 to a highly decreased extent so that also the axial displacements between the legs 10 and the side-walls of the corresponding apertures in the cutting member are slight, owing to which a more regular functioning of the cutting member is ensured. Here the special pressure means mentioned in the description of Fig. 1, may be dispensed with on account of the force-increasing effect of the cone 15 provided on the shaft 8.

What I claim is:

1. Dry shaving apparatus comprising a driving shaft having a given longitudinal axis, a framework member provided with an outer side-wall portion and a central support portion secured to the said side-wall portion and comprising a central part having an axis coincident to said given axis, said central support portion being provided with apertures arranged along the circumference of a circle centered on said axis, a cutting plate member having an outer portion thereof coupled to said sidewall portion and a central portion thereof coupled to said central part, a cutting head member engaging said cutting plate member and mounted for rotation on the said central part, and means within said apertures for transmitting power from the said shaft to the said cutting head member.

2. Dry shaving apparatus comprising a driving shaft having a given longitudinal axis, a framework member provided with an outer side-wall portion and a central support portion secured to the said side-wall portion and comprising a central part having an axis coincident to said given axis, said central support portion being provided with apertures arranged along the circumference of a circle centered on said axis, a cutting plate member having an outer portion thereof coupled to said sidewall portion and a central portion thereof coupled to said central part, a cutting head member engaging said cutting plate member and mounted for rotation on the said central part and being provided with openings, a tubular member surrounding the said central part and provided with leg-like projections fitting into the said openings of the said cutting head member, and means within said apertures engaging the said tubular member and transmitting power from the said shaft to the said cutting head member.

3. Dry shaving apparatus comprising a driving shaft having a given longitudinal axis, a framework member provided with an outer side-wall portion and a central support portion secured to the said side-wall portion and comprising a central part having an axis coincident to said given axis and consisting partly of a hollow cylinder provided with apertures arranged along the circumference of a circle centered on said axis, a cutting plate member having an outer portion thereof coupled to said sidewall portion and a central portion thereof coupled to said central part, a cutting head member engaging said cutting plate member and mounted for rotation on the said central part and being provided with openings, a tubular member mounted around the said central part and provided with leg-like projections fitting into the openings of the said cutting head member, and means within said apertures for transmitting power from the said shaft to the said tubular member and therethrough to the said cutting head member.

4. Dry shaving apparatus comprising a driving shaft having a given longitudinal axis, a framework member provided with an outer side-wall portion and a central support portion secured to the said side-wall portion and comprising a central part having an axis coincident to said given axis and consisting partly of a hollow cylinder provided with apertures arranged along the circumference of a circle centered on said axis, a cutting plate member having an outer portion thereof coupled to said sidewall portion and a central portion thereof coupled to said central part, a cutting head member engaging said cutting plate member and mounted for rotation on the said central part and being provided with openings, a tubular member mounted around the said central part and provided with leg-like projections fitting into the openings of the said cutting head member, and means within said apertures for transmitting power from the said shaft to the said tubular member and therethrough to the said cutting head member.

5. Dry shaving apparatus comprising a driving shaft having a given longitudinal axis, a framework member provided with an outer side-wall portion and a central support portion secured to the said side-wall portion and comprising a central part having an axis coincident to said given axis, said central support portion being provided with apertures arranged along the circumference of a circle centered on said axis, a cutting plate member having an outer portion thereof coupled to said sidewall portion and a central portion thereof coupled to said central part, a cutting head member engaging said cutting plate member and mounted for rotation on the said central part and being provided with apertures for transmitting power from the said shaft to the said cutting head member.

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